# BICCCA

## BIOLOGICAL IMPACTS OF CLIMATE CHANGE IN CALIFORNIA

## An Overview

pier
PUBLIC INTEREST ENERGY RESEARCH
"Research Powers the Future"

**Terry L. Root**
**Woods Institute**
**of the Environment**
**Stanford University**

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## The Focus:

**Senior Grad Students and Postdoctoral Fellows**

## The Purpose:

1. **Cohort of interdisciplinary scientist**
2. **Comfortable with uncertainty**
3. **Encourage creative solutions**




**4. Research focus on manger needs**

**5. Connect managers with scientists**

**6. Foster communication skill**

**-Among scientists**

**-With managers & policy makers**

**-Interesting to general public**

**7. Write an edited book**

# Mentors:

Kim Hall, Michigan State University

Mark Herzog, PRBO Conservation Science

Chrissy Howell, Prbo Conservation Science




# 36 Applications

| | | | |
|---|---|---|---|
| **UC, Berkeley** | **10** | **UC, Riverside** | **2** |
| **UC, Davis** | **8** | **UC, Santa Cruz** | **2** |
| **Stanford Univ.** | **5** | UC, San Diego | 1 |
| UC, Irvine | 3 | UC, Los Angeles | 1 |
| **UC, Santa Barbara** | **3** | **San Francisco State** | **1** |

Graduate Students 25

Postdoctoral Fellows 11

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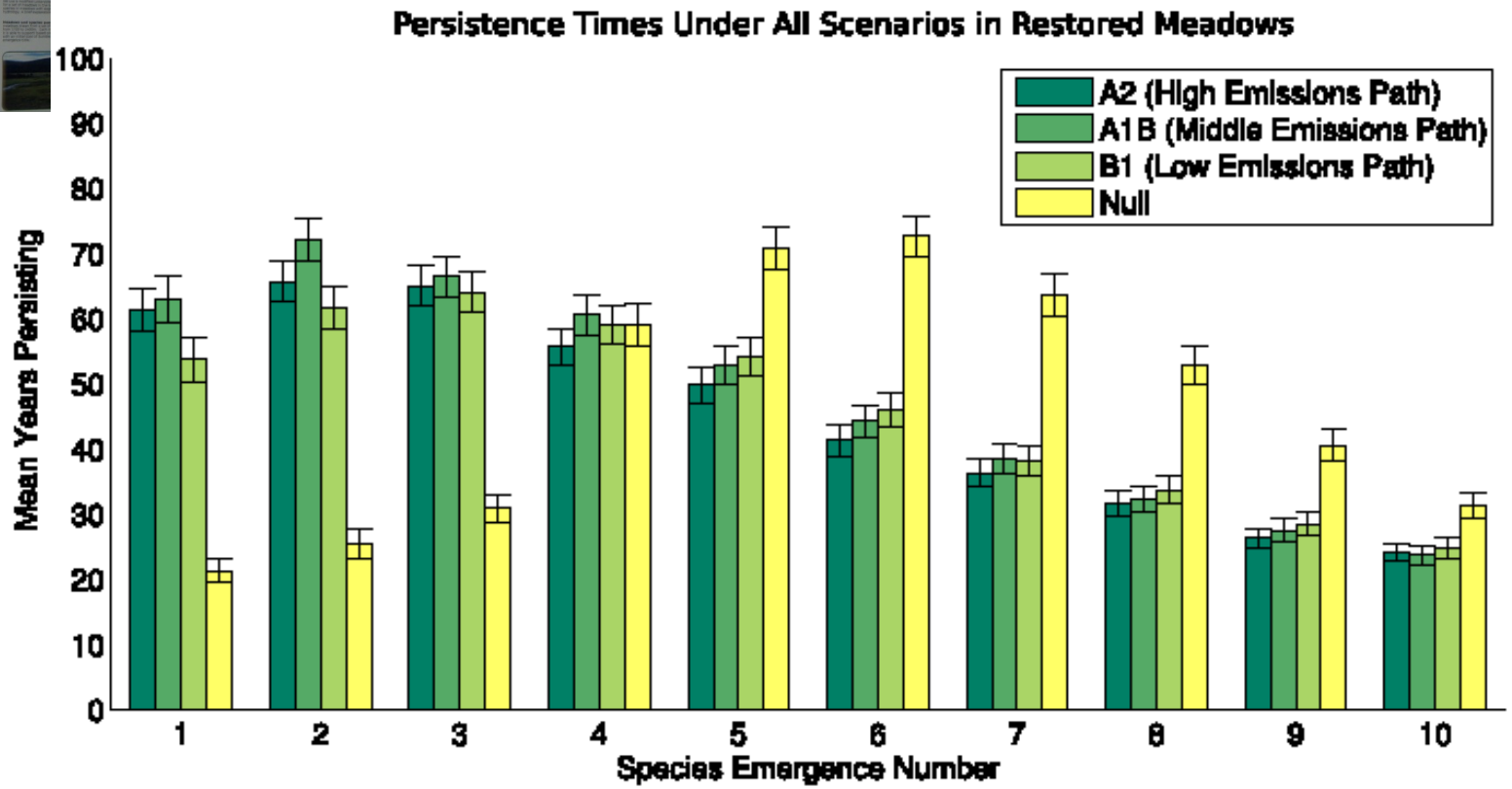
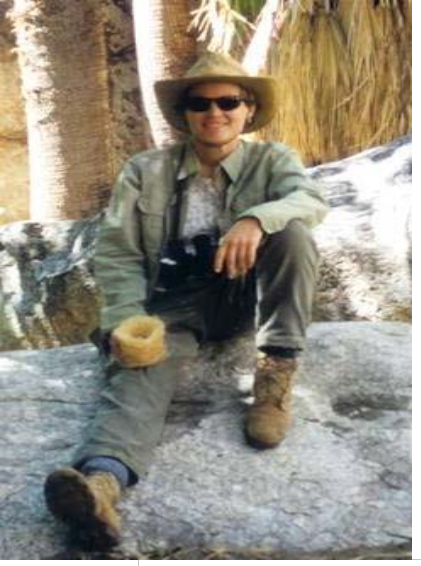
# Alden Griffith, UCSC

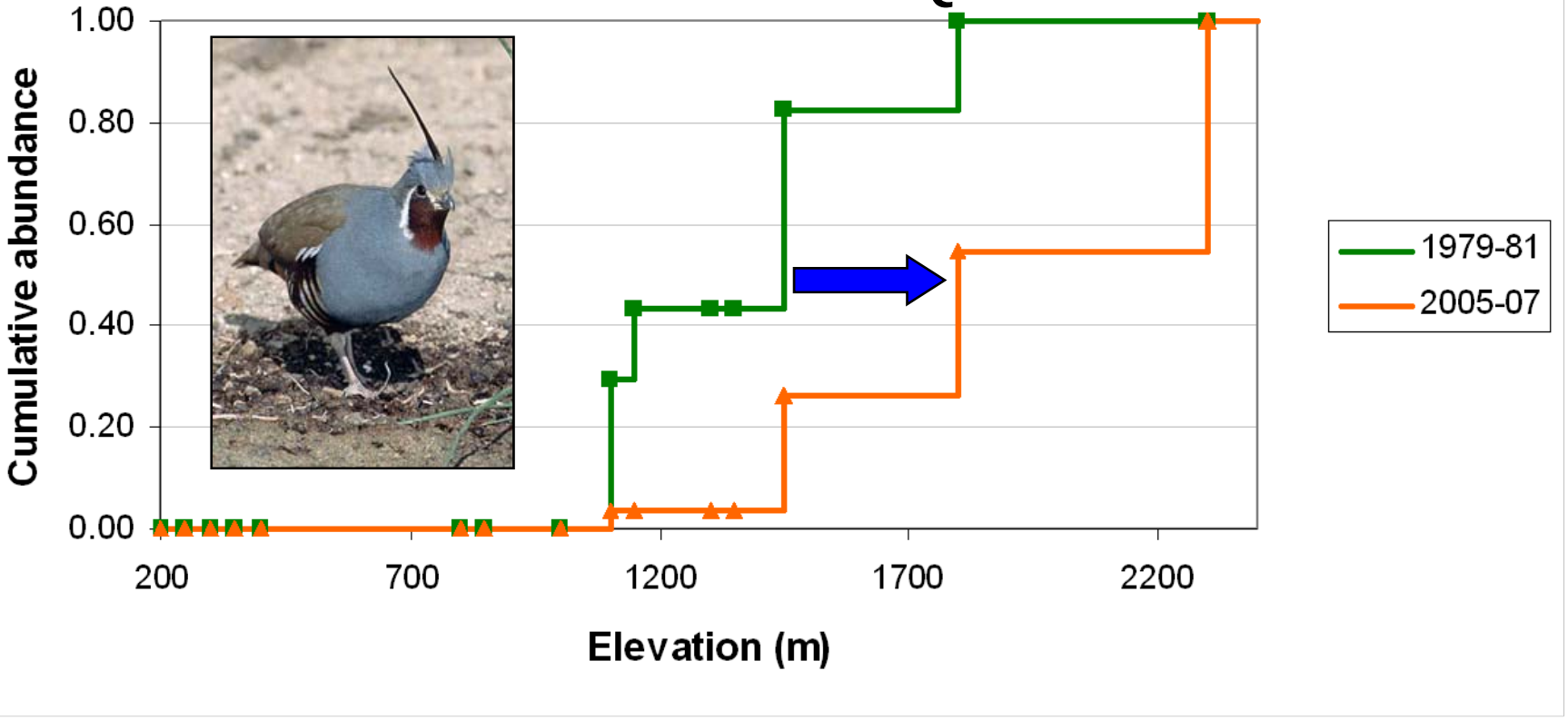
# Brendan Colloran, SFState



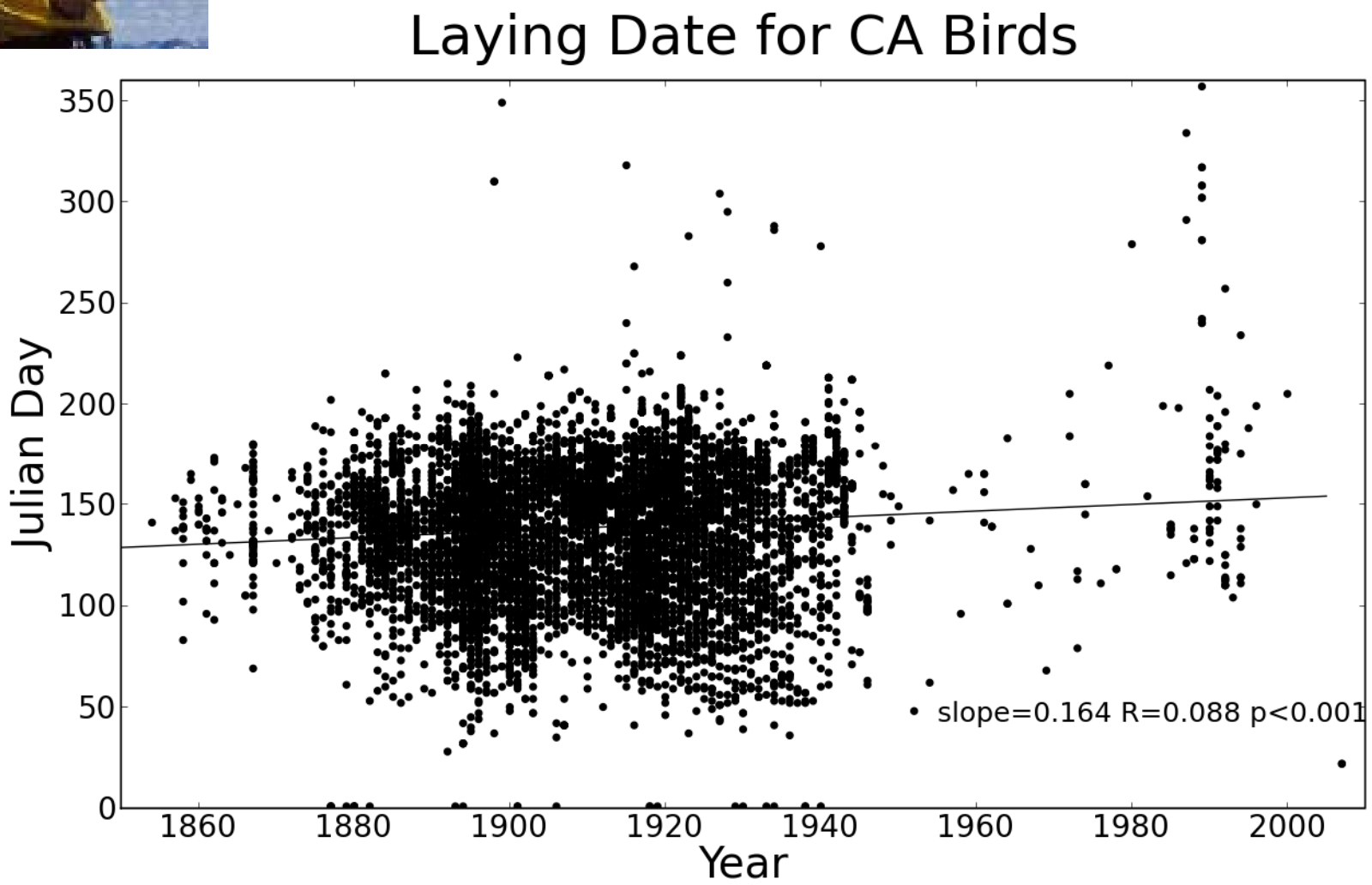


Lori Hargrove, UC Riverside

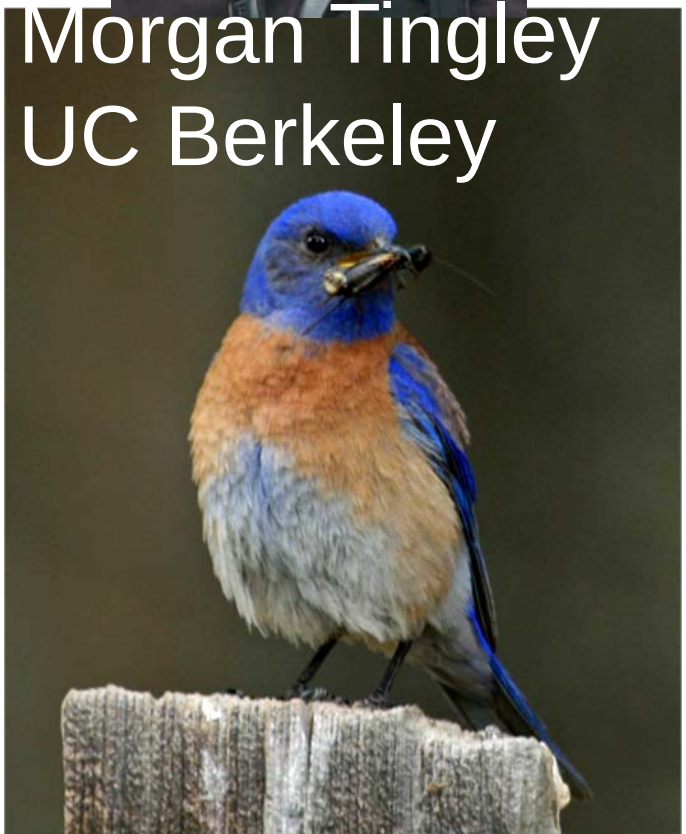
# Upward shift in elevational distribution: Mountain Quail

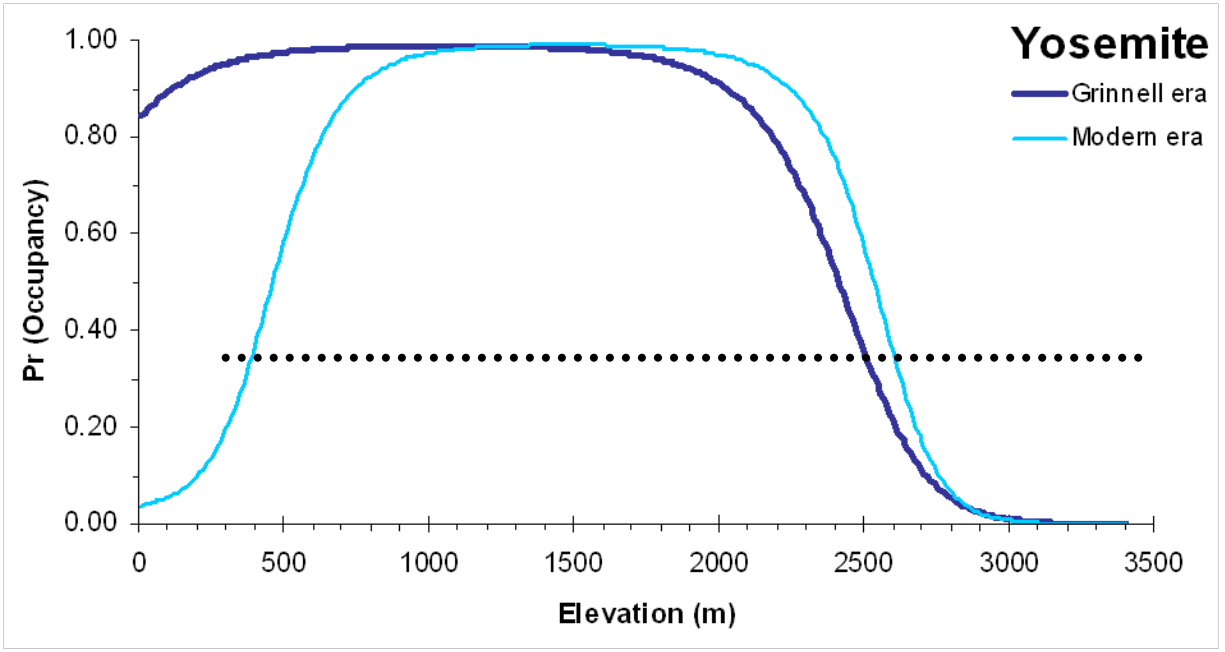


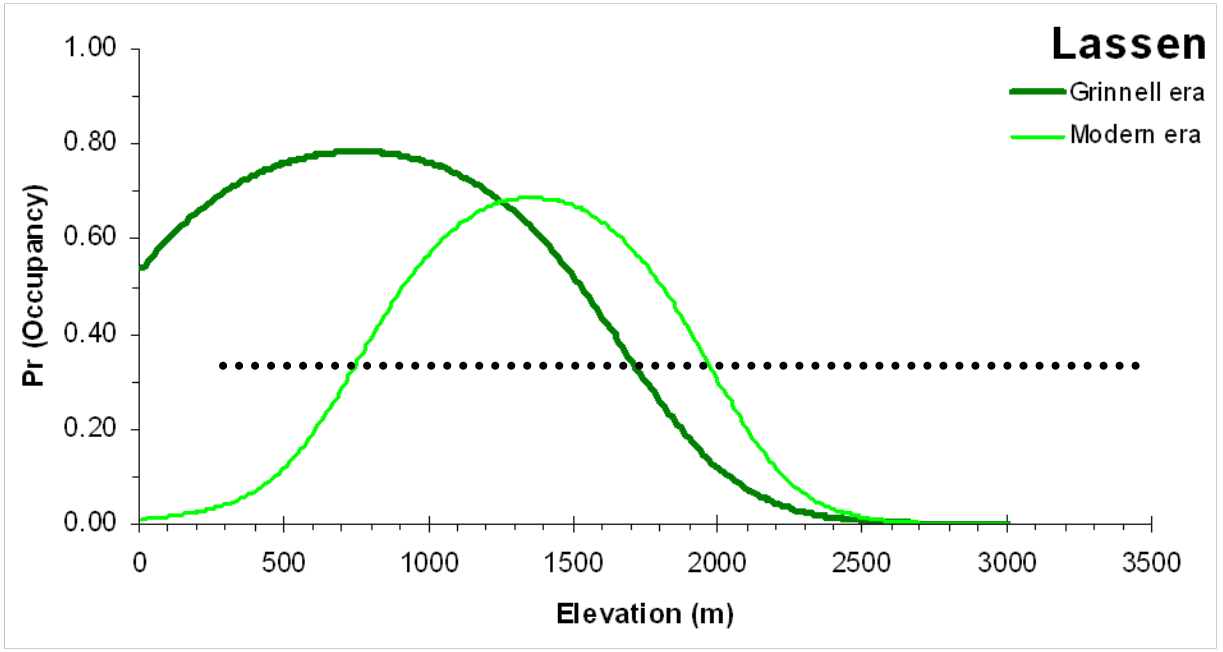
# Judsen Bruzgul, Stanford University

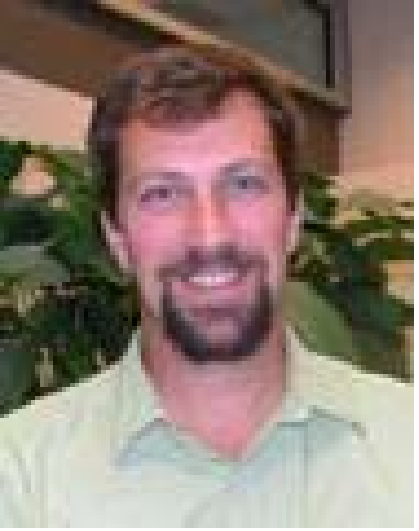


Morgan Tingley
UC Berkeley







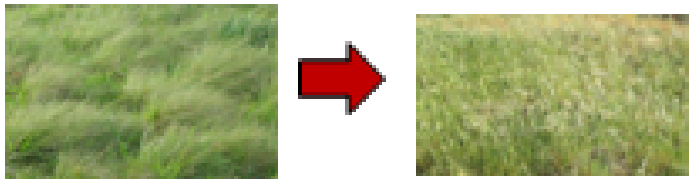
Jeff Dorman

UC, Berkeley

Laurie Koteen, UC, Berkeley

# Ecosystem Change in California Grasslands: Effects of Species Invasion on Climate

**California grasslands have undergone a dramatic shift from**



Native Perennial Grasses

Exotic Annual Grasses

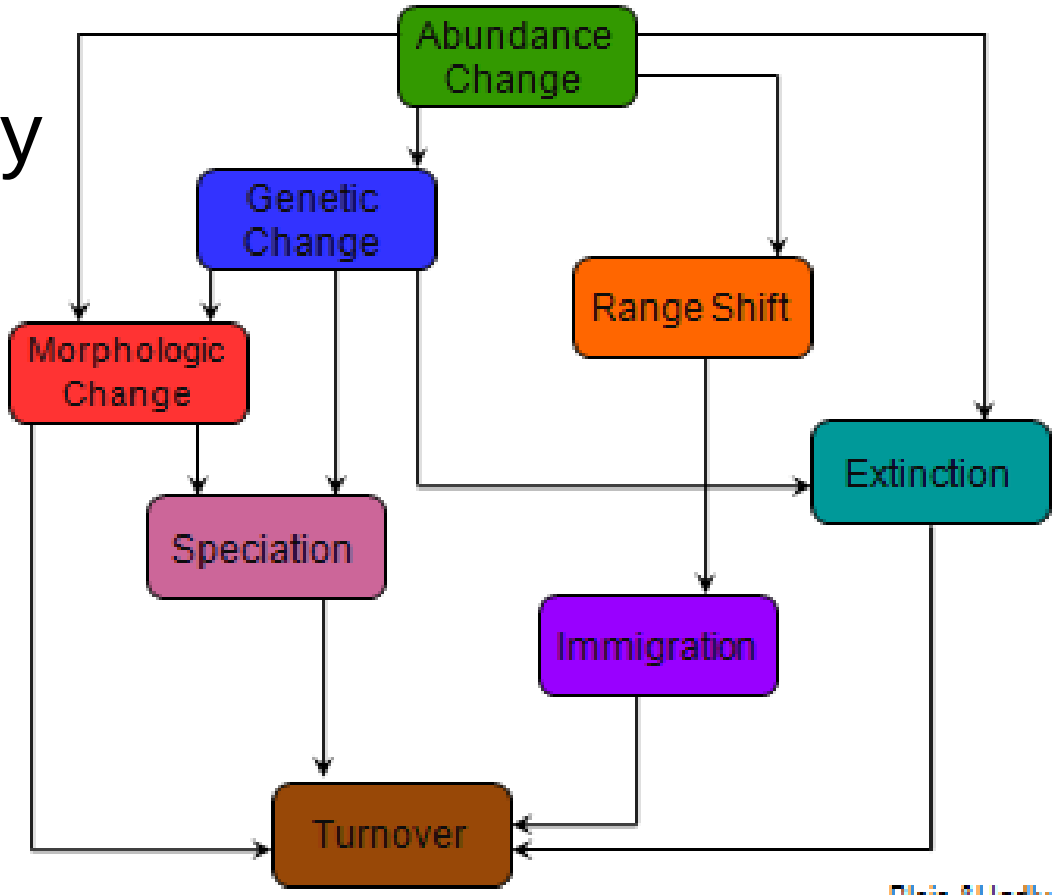
**Across ten million acres of grassland habitat.**

**Resulting in...**

- A transfer of approximately 5 tons per hectare of carbon from terrestrial storage to the atmosphere at the sites investigated.
- A decrease in surface albedo, causing an increase in midday summer temperatures of up to 6°C (11°F).
- A reduction in latent heat flux (evaporation) during the summer months and an increase in sensible heat flux.

# Biotic Responses to Climate Change

Jessica Blois,
Stanford University




Blois &Hadly, in review

# Two key paths of action

*“Big picture” actions*

*Premise: If $CO_2$ emissions are not reduced, there will be few opportunities for adaptation over the long term.*

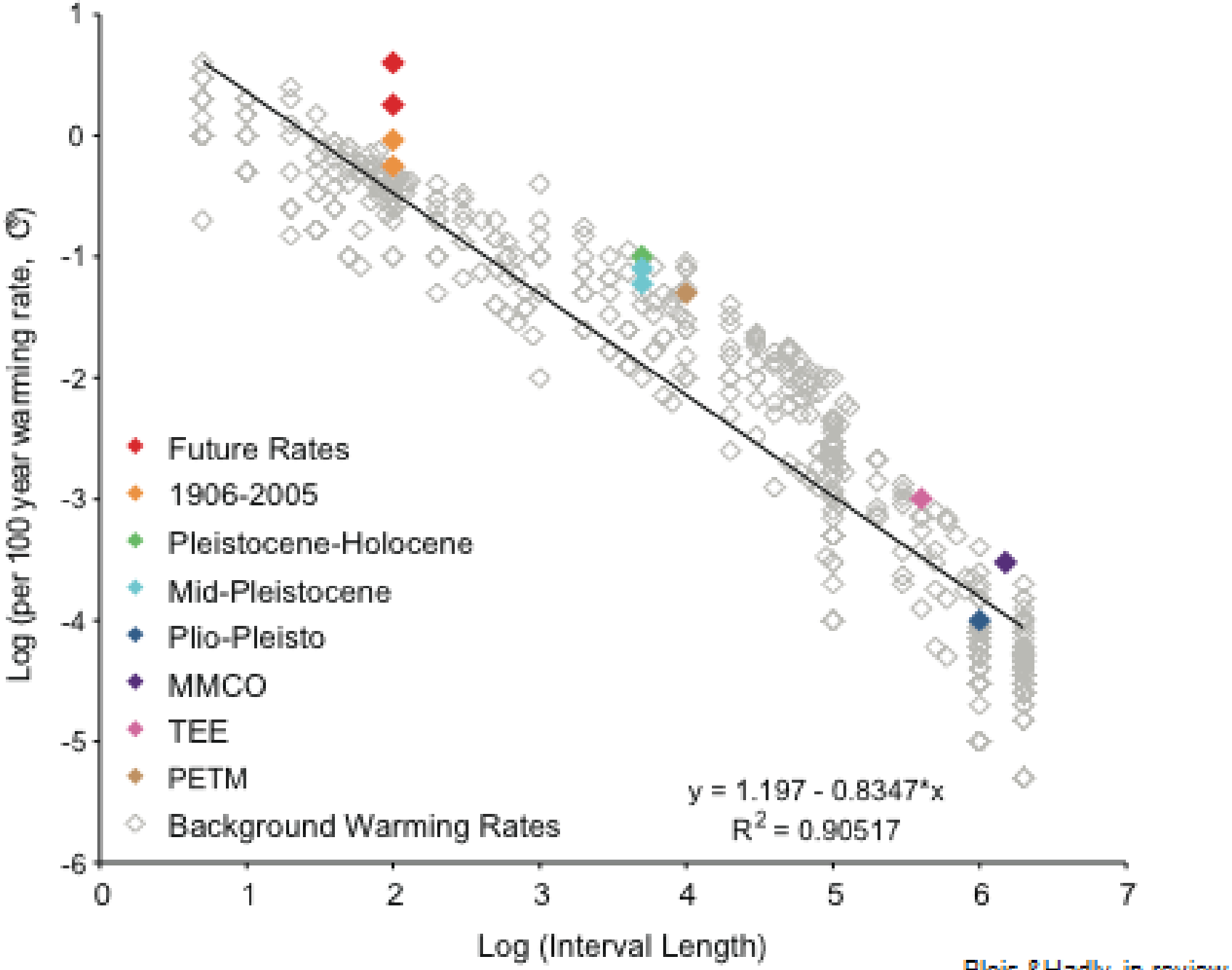
- Take advantage of opportunities to convince the public and policymakers to act to reduce emission rates.

*“Local management” actions*

*Premise: Species have and will continue to respond to changes in climate, sometimes in unpredictable ways.*

- Work with managers and policy-makers to support key functions and ecological processes, build in flexibility, and expect surprises.

# Zooplankton Response to Climate Change in the California Current




Blois &Hadly, in review

# Goal – Help participants:

- Become climate change pro-active:
  - Link theory and practice
  - Facilitate creative solutions
- Quantify uncertainty
- Communicate
- Develop a network

• found that the invasive plant, cheatgrass, is capable of rapid population growth (doubling in one year) at high elevations along the edge of the eastern Sierra Nevada.

• found nonlinear and complicated effects of climate at this elevation in contrast to previous studies at low elevation. This highlights the layers of complexity that we're dealing with when looking at how climate change may affect invasions.